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Indian Standard

SPECIFICATION FOR ENAMEL, SYNTHETIC, EXTERIOR, AIR DRYING, FOR USE ON PRIMED SURFACES OF MOTOR VEHICLES AND OTHER EQUIPMENT

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

SPECIFICATION FOR ENAMEL, SYNTHETIC, EXTERIOR, AIR DRYING, FOR USE ON PRIMED SURFACES OF MOTOR VEHICLES AND OTHER EQUIPMENT

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Indian Standard

SPECIFICATION FOR ENAMEL, SYNTHETIC, EXTERIOR, AIR DRYING, FOR USE ON PRIMED SURFACES OF MOTOR VEHICLES AND OTHER EQUIPMENT

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 November 1978, after the draft finalized by the Paints and Allied Products Sectional Committee had been approved by the Chemical Division Council.

0.2 The material to this specification is intended for use by automobile body builders, manufacturers of trailers and for finishing of electrical machines and is resistant to kerosene, water and slight rise in temperature during use. IS : 2932-1974*, IS : 6125-1971† and IS : 8662-1978‡ cover the material for certain other specific uses.

0.3 For satisfactory results it is desirable that the primer, undercoating and the finishing enamels are obtained from the same manufacturer. For the purpose of testing the primer, undercoating and the finishing enamel shall be obtained from the same source.

0.4 This standard contains clause **6.1** which calls for agreement between the supplier and the purchaser.

0.5 In the preparation of this standard substantial assistance has been derived from data supplied by Directorate General of Supplies & Disposals, New Delhi which is gratefully acknowledged.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960§. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing (*first revision*).

†Specification for enamel, synthetic, stoving, for automobiles.

‡Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing, for railway coaches.

§Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes requirements and methods of sampling and test for the material commercially known as enamel, synthetic, exterior, air drying, for use on primed surfaces of motor vehicles and other equipment.

1.1.1 The material is used for painting systems for protection and decoration of bus bodies, trailers, electrical machines, etc, which come in contact with kerosene, lubricating oils and water and electrical machines which get heated up during use resulting in slight rise in temperature.

2. TERMINOLOGY

2.1 For the purpose of this standard, the following definition in addition to those given in IS : 101-1964* and IS : 1303-1963† shall apply.

2.1.1 *Registered Sample* — Sample supplied in advance by a prospective supplier and registered by the approved testing authorities after testing it to all the requirements of this standard. A complete record of the performance shall be kept in respect of all tests.

3. CLASSES

3.1 The material shall be supplied in brushing consistency but shall be suitable for application by spraying after thinning with suitable thinner as agreed between the purchaser and the supplier.

3.1.1 The material required, whether undercoating or finishing, shall be clearly specified by the indentor.

4. COLOUR CATEGORIES

4.1 For the purpose of the registration of the samples of the material, the colour categories given in Table 1 shall be employed.

5. REQUIREMENTS

5.1 Composition — The material shall be based on synthetic resins, free from natural resins or their derivatives or their modifications, in any form when tested in accordance with **19** of IS : 197-1969 . It shall be of such a composition as to satisfy the requirements of this standard. The compositions of the pigment and the vehicle of the bulk supply shall be similar to those of the registered sample within the permissible limits specified in this standard.

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*Methods of test for ready mixed paints and enamels (*second revision*).

†Glossary of terms relating to paints (*revised*).

‡Methods of sampling and test for varnishes and lacquers (*first revision*).

TABLE 1 COLOUR CATEGORIES

(*Clause* 4.1)

COLOUR CATEGORY No. (1)	COLOUR SHADE (2)	INDIAN STANDARD COLOUR No. (ACCORDING TO IS : 5-1978*) (3)	SHADE RECOMMENDED FOR REGISTRATION OF SAMPLE (4)
1	White	—	White
2	Black	—	Black
3	Dark violet	796	Dark violet
4	i) Sky blue	101	Turquoise blue
	ii) Turquoise blue	102	
	iii) Oriental blue	174	
5	i) Eau-de-nil	216	Apple green
	ii) Opaline green	275	
	iii) Apple green	281	
6	i) Peacock blue	103	Traffic blue
	ii) Azure blue	104	
	iii) Traffic blue	169	
7	i) Oxford blue	105	Oxford blue
	ii) Navy blue	106	
8	Aircraft blue	108	Aircraft Blue
9	French blue	166	French blue
10	i) Sea green	217	Sea green
	ii) Verdigris green	280	
11	i) Sage green	219	Sage green
	ii) Light olive green	278	
	iii) Aircraft grey green	283	
12	i) Grass green	218	Traffic green
	ii) Traffic green	267	
	iii) India green	284	
13	i) Brilliant green	221	Middle brunswick green
	ii) Light brunswick green	225	
	iii) Middle brunswick green	226	
	iv) Deep brunswick green	227	
	v) Lincoln green	276	
	vi) Cypress green	277	
	vii) Forest green	282	
14	i) Olive green	220	Olive green
	ii) Light bronze green	222	
	iii) Middle bronze green	223	
	iv) Deep bronze green	224	
	v) Steel furniture green	279	
	vi) Olive drab	298	
15	Canary yellow	309	Canary yellow

*Colours for ready mixed paints and enamels (*third revision*).

(*Continued*)

TABLE 1 COLOUR CATEGORIES — *Contd*

COLOUR CATEGORY No. (1)	COLOUR SHADE (2)	INDIAN STANDARD COLOUR No. (ACCORDING TO IS : 5-1978*) (3)	SHADE RECOMMENDED FOR REGISTRATION OF SAMPLE (4)
16	i) Lemon	355	Golden yellow
	ii) Golden yellow	356	
17	i) Pale cream	352	Pale cream or deep cream
	ii) Deep cream	353	
	iii) Light stone	361	
	iv) Portland stone	364	
	v) Vellum	365	
	vi) Light straw	384	
	vii) Light biscuit	385	
	viii) Champagne	386	
	ix) Sunshine	387	
	x) Beige	388	
	xi) Jasmine yellow	397	
	xii) Light salmon pink	442	
	xiii) Salmon pink	443	
18	Primrose	354	Primrose
19	Light buff	358	Light buff
20	i) Middle buff	359	Deep buff
	ii) Deep buff	360	
	iii) Middle stone	362	
21	i) Dark stone	363	Light brown
	ii) Light brown	410	
	iii) Middle brown	411	
	iv) Golden brown	414	
	v) India brown	415	
	vi) Leaf brown	489	
22	i) Dark brown	412	Gulf red
	ii) Nut brown	413	
	iii) Orange brown	439	
	iv) Venetian red	445	
	v) Red oxide	446	
	vi) Deep Indian red	448	
	vii) Light purple brown	449	
	viii) Chocolate	451	
	ix) Gulf red	473	
	x) Beech brown	490	
	xi) Service brown	499	
23	Terra cotta	444	Terra cotta

*Colours for ready mixed paints and enamels (*third revision*).

(*Continued*)

TABLE 1 COLOUR CATEGORIES — *Contd*

COLOUR CATEGORY No.	COLOUR SHADE	INDIAN STANDARD COLOUR No. (ACCORDING TO IS : 5-1978*)	SHADE RECOMMENDED FOR REGISTRATION OF SAMPLE
(1)	(2)	(3)	(4)
24	i) Fire red	536	Post office red or signal red
	ii) Signal red	537	
	iii) Post office red	538	
	iv) Crimson	540	
	v) International orange	592	
25	Maroon	541	Maroon
26	i) Traffic yellow	368	Light orange
	ii) Light orange	557	
	iii) Traffic red	570	
	iv) Deep orange	591	
27	India saffron	574	India saffron
28	i) Silver grey	628	Light grey or aircraft grey
	ii) Quaker grey	629	
	iii) French grey	630	
	iv) Light grey	631	
	v) Dark admiralty grey	632	
	vi) Smoke grey	692	
	vii) Aircraft grey	693	
	viii) Dove grey	694	
	ix) Light admiralty grey	697	
29	i) AF blue grey	633	AF blue grey
	ii) Slate	634	
	iii) Lead	635	
	iv) Middle graphite	671	
	v) Dark blue grey	695	

*Colours for ready mixed paints and enamels (*third revision*).

5.1.1 The quantity of each of the major constituent of the pigment composition of the bulk supply and that of the registered sample shall not deviate by more than ± 25 percent by mass of the recorded data on the registered sample, when the supply is of a shade different from the registered sample but in the same colour category. However, when the bulk supply is of the same shade as that of the registered sample the deviation shall not be more than ± 15 percent by mass of the recorded data on the registered sample.

NOTE — Any constituent of the pigment showing 20 percent and more by mass of the total pigment composition shall be considered a major constituent of the pigment composition.

5.1.2 The total quantity of extenders in the pigment composition of the bulk supply and that of the registered sample shall not deviate by more than ± 25 percent by mass of the data recorded on the registered sample when the supply is of a shade different from the registered sample but in the same colour category. When the bulk supply is of the same shade as that of the registered sample the deviation in the total quantity of extenders shall not be more than ± 15 percent by mass of the data recorded on the registered sample. These limits shall apply even if the extender is not a major constituent of the pigment composition. Any silicious and/or extraneous matter present to the extent of 0·5 percent by mass on paint if absent in bulk supply shall not be the cause for rejection.

5.1.2.1 When no extender is present in the pigment composition of the registered sample, not more than 5 percent by mass of silicious matter on the pigment composition shall be allowed in the bulk supply.

5.1.3 In undercoatings the sum total of genuine pigments shall not deviate by more than ± 25 percent by mass of the data recorded on the registered sample between the registered sample and the bulk supply, when the supply is of a different shade from the registered sample but in the same colour category. However, when the bulk supply is of a different shade from the registered sample the deviation shall not be more than 15 percent by mass of the data recorded on the registered sample.

5.1.4 The total non-volatile matter which includes pigments and vehicle solids, shall not deviate by more than ±10 percent by mass of the recorded data on the registered sample. This applies to both undercoatings and finishing enamels for the same as well as different shade within the same colour category as that of the registered sample.

5.1.5 The total pigment content of the bulk supply shall not deviate by more than ± 15 percent by mass of the data recorded on the registered sample when the supply is of the same shade as that of the registered sample. When the bulk supply is of a shade different from that of the registered sample, the deviation allowed shall be ± 25 percent by mass of the data recorded on the registered sample.

5.1.6 The vehicle of the enamel shall essentially consist of a drying oil modified alkyd resin with suitable thinner and driers. On analysis the non-volatile vehicle shall yield not less than 25 percent by mass of phthalic anhydride when estimated by the method prescribed in **17.6** of IS : 354-1976*. It shall, however, not deviate by more than ± 10 percent by mass in the bulk supply as compared to recorded data on the registered sample.

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*Methods of sampling and test for resins for paints (*first revision*).

5.2 Durability

5.2.1 *Registered Sample*

5.2.1.1 When prepared and tested as prescribed under **A-3** up to a period of 12 months preferably at National Test House, Calcutta, film prepared from the sample for registration of the material shall satisfy the requirement of the test.

5.2.1.2 A film of the sample for registration shall be prepared and tested as prescribed under **A-4** in an accelerated weathering apparatus and examined every third day for a period of 21 days and a complete record of its performance maintained.

NOTE — As a precaution against inadvertent accidents, it is recommended that the outdoor exposure test (*see* **A-3**) and the accelerated weathering test (*see* **A-4**) are carried out in duplicate.

5.2.2 *Sample from Bulk Supply* — The characteristics of the film of the material prepared from a representative sample of the bulk supply as prescribed in **A-2**, tested in the accelerated weathering apparatus (*see* **A-4**) and examined every third day for a period of 21 days shall not deviate by more than the limits specified in **5.2.2.1** and **5.2.2.2**.

5.2.2.1 Gloss (specular 45°) retention of bulk supply shall be within ± 10 units of that of the registered sample.

NOTE — At any time during the weather-o-meter test, the percentage value of gloss retention of the bulk supply sample shall not vary by more than ±10 from the recorded data of the registered sample; for example, when the registered sample showed 70 percent gloss retention at any particular stage of weather-o-meter test, the bulk supply sample shall show gloss retention of 60 percent to 80 percent at the corresponding stage of testing.

5.2.2.2 The results of observation on characteristics of colour, checking, chalking and spotting of bulk supply shall not be more than slightly different from those recorded for the registered sample.

5.3 The material shall also comply with the requirements given in Table 2.

5.4 Mass in kg per 10 Litres — The minimum mass in kg/10 litres of the material when tested in accordance with **25** of IS : 101-1964* shall be 12·0 and 8·5 for undercoating and finishing respectively. It shall be, however, within ±3 percent when the shade is the same as that of the registered sample and ±5 percent when the shade is different from the registered sample but within the same colour category. In no case, however, the mass per 10 litres shall be less than the stipulated minimum, as specified above.

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*Methods of test for ready mixed paints and enamels (*second revision*).

TABLE 2 REQUIREMENT FOR ENAMEL, SYNTHETIC, EXTERIOR, AIR DRYING, FOR USE ON PRIMED SURFACES OF MOTOR VEHICLES AND OTHER EQUIPMENT

(*Clause* 5.3)

SL No.	CHARACTERISTIC	REQUIREMENT FOR		METHOD OF TEST, REF TO CL NO.	
		Undercoating	Finishing		
(1)	(2)	(3)	(4)	(5)	
i)	Drying time, *Max*:				of IS : 101-1964*
	a) Surface dry	2 hours	2 hours	7.1	
	b) Hard dry	8 hours	8 hours	7.2	
	c) Tack free	—	24 hours	7.3	
ii)	Consistency	Smooth and uniform and suitable for brushing without appreciable drag on the brush		7.4	
iii)	Finish	Smooth and matt to egg shell gloss	Smooth and glossy	7.5	
iv)	Wet opacity	Between −10 percent and +20 percent of the registered sample		10	
v)	Colour	Approximate match to the finishing enamel	Close match to the specified IS colour or to an agreed colour where IS colour is not specified	11	
vi)	Water content (if water is suspected to be present), percent by mass, *Max*	0·5	0·5	14	
vii)	Scratch hardness after 48 hours air-drying	No such scratch as to show bare metal		15.1	
viii)	Flexibility and adhesion	No visible damage or detachment of the film after 48 hours air-drying	No visible damage or detachment of the film after 96 hours air-drying followed by cooling for 6 hours at 0°C	16	

*Methods of test for ready mixed paints and enamels (*second revision*).

(*Continued*)

TABLE 2 REQUIREMENT FOR ENAMEL, SYNTHETIC, EXTERIOR, AIR DRYING, FOR USE ON PRIMED SURFACES OF MOTOR VEHICLES AND OTHER EQUIPMENT — *Contd*

Sl No.	Characteristic	Requirement for		Method of Test, Ref to Cl No.
		Undercoating	Finishing	
(1)	(2)	(3)	(4)	(5)
ix)	Stripping test after 96 hours air-drying	Scratches free from jagged edges		17 of IS : 101-1964*
x)	Protection against corrosion in a system	—	No sign of corrosion on the metal surface when examined after the paint film is removed	18
xi)	Resistance to lubricating oil	—	To pass the test	19
xii)	Resistance to petrol	—	To pass the test	21
xiii)	Resistance to heat	—	To pass the test	22
xiv)	Flash point	Not below 30°C	Not below 30°C	24
xv)	Resistance to water and soap spotting	—	To pass the test	Appendix E† of IS : 6125-1971‡
xvi)	Impact resistance	—	To pass the test	Appendix G† of IS : 6125-1971‡
xvii)	Keeping properties	Not less than one year	Not less than one year	31 of IS : 101-1964*

*Methods of test for ready mixed paints and enamels (*second revision*).

†The test panels shall be prepared as given in **A-2** and allow to air dry for 48 hours before carrying out these tests.

‡Specification for enamel, synthetic, stoving, for automobiles.

6. PACKING AND MARKING

6.1 Packing — Unless otherwise agreed to between the purchaser and the supplier, the enamel shall be packed in metal containers conforming to IS : 1407-1968* or IS : 2552-1970†.

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*Specification for round paint tins (*first revision*).

†Specification for steel drums (galvanized and ungalvanized) (*first revision*).

6.2 Marking — Each container shall be marked with the following:

a) Name of the material and whether undercoating or finishing;
b) Name of the manufacturer and/or his trade-mark, if any;
c) Volume of the material;
d) Batch number or lot number in code or otherwise; and
e) Month and year of manufacture.

6.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. SAMPLING

7.1 Preparation of Test Samples

7.1.1 *For Registration* — The sample shall be submitted in three different containers each containing not less than 500 ml of the material.

7.1.1.1 As testing to the requirements of this standard covers a period of 12 months, the supplier is advised to submit samples for registration sufficiently in advance within the period from *October to December* of the year, so that outdoor exposure test can be started during the period stipulated in **A-3.1**.

7.1.2 *Tender Sample* — The supplier may dispense with sending a tender sample provided that he declares that the material for which the tender is given is of the same quality as the sample previously registered in his name.

7.1.3 *Bulk Supply Sample* — Representative samples of the material shall be drawn and treated as prescribed under **3** of IS : 101-1964*.

7.2 Criteria for Conformity — A lot shall be declared conforming to the requirements of this standard if the test results on the composite sample satisfy the requirements prescribed under **5**.

8. TEST METHODS

8.1 Tests shall be carried out according to the methods prescribed in IS : 101-1964*, IS : 6125-1971† and Appendix A of this standard. Reference to the relevant clauses of these standards is given in col 5 of the Table 2 and **5.4**.

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*Methods of test for ready mixed paints and enamels (*second revision*).

†Specification for enamel, synthetic, stoving, for automobiles.

8.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

8.3 Comparison with the performance of the registered sample shall be carried out on the basis of records maintained for the registered sample (*see* **5.2.1**).

8.4 For match against Indian Standard colours, IS : 5-1978† shall be used.

APPENDIX A

(*Clause* 5.2)

TEST FOR DURABILITY

A-0. GENERAL

A-0.1 Outline of the Method — The durability of the material is determined by ascertaining actual behaviour of suitably prepared test panels in normal outdoor exposure test for a specified period and evaluating the results of this exposure by a suitable method of rating for various characteristics of the film of the material. Apart from this, the material is also evaluated by an accelerated weathering test wherein a prepared panel is subjected to controlled exposure of heat, light and water in an artificial weathering apparatus.

A-1. TEST PANELS

A-1.1 The panels shall be mild steel plate (*see* IS : 513-1973‡), 1·6 mm thick and free from surface defects. Panels for outdoor exposure test shall be 300 × 300 mm in size and 150 × 75 mm for the accelerated weathering test. The panels shall be cleaned as prescribed under **5.2.1** of IS : 101-1964§ and the back and edges of the panels shall be protected with two coats of suitable paint.

A-2. PREPARATION OF TEST PANELS

A-2.1 In the painting procedure outlined under **A-2.2**, the air-drying of the films shall be done at room temperature as defined under **2.9** of IS : 101-1964§ and at relative humidity of not more than 70 percent.

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*Specification for water for general laboratory use (*second revision*).

†Colours for ready mixed paints and enamels (*third revision*).

‡Specification for cold rolled carbon steel sheets (*second revision*).

§Methods of test for ready mixed paints and enamels (*second revision*).

A-2.2 The surface of the test panels to be exposed shall be prepared as follows taking care that the total dry film thickness of the complete system shall be between 75 and 100 microns:

a) Apply one coat of ready mixed paint, red oxide-zinc chrome, priming (conforming to IS : 2074-1962*) by appropriate method (brushing/spraying), and allow to dry for 24 hours.

b) Rub down lightly with waterproof emery paper No. 220/240 and then apply by appropriate method (brushing/spraying), one coat of the undercoating enamel conforming to this standard and allow to air-dry for 24 hours.

c) Rub down, wet with waterproof emery paper No. 220/240, wipe off the surface using a piece of clean dry soft cloth and then apply by appropriate method (brushing/spraying), one coat of the finishing enamel conforming to this standard and allow to air-dry for 48 hours.

d) Rub down, wet with waterproof emery paper No. 320, wash and wipe off water and when the surface is dry apply by appropriate method (brushing/spraying), a second coat of the finishing enamel and allow to air-dry for 7 days before subjecting to exposure test.

NOTE — The primer, undercoat and finishing enamel shall be from the same supplier.

A-3. NORMAL OUTDOOR EXPOSURE TEST

A-3.0 Subject the samples for registration and the tender samples, if supplied, to normal outdoor exposure test in the manner described under **A-3.1**.

A-3.1 Expose in the open the test panels, prepared in the manner prescribed under **A-1** and **A-2** in duplicate, at an angle of 45° facing south. Commence the exposure *not earlier than the third week of January and not later than the first week of April.*

A-3.1.1 Examine the condition of the exposed films at monthly intervals for the first quarter and thereafter quarterly for the rest of the period for the following characteristics:

a) Gloss;

b) Colour;

c) Checking, cracking and flaking;

d) Chalking; and

e) Spotting.

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*Specification for ready mixed paint, red oxide-zinc chrome, priming.

A-3.1.2 For the above examinations, wash the right-hand half of the surface of the two test panels by pouring water and then wiping with a soft cloth or chamois leather (*see* IS : 1017-1966*). Adequate time for cooling of the panels to room temperature shall be allowed prior to washing. Examine the same half of the test panels at each examination. As an aid in the examination, a magnifying glass may be used, but the evaluation shall be based on an assessment with the unaided eye. At the end of the stipulated period for durability test, examine the two halves of the test panels. The sample shall be considered satisfactory if the material surface underneath as well as condition of the film in both the halves, the one washed periodically as well as the one washed only for the final examination is satisfactory by the method of evaluation described in **A-3.2**. Stray film failure due to extraneous causes other than climatic shall be ignored.

A-3.2 Evaluation of Unexposed Test Panels — The properties of the film of an exposed test panel shall be recorded for the following characteristics:

a) Possessing high gloss, with units of gloss reading (specular 45°);
b) Possessing correct colour (matching the stipulated shade);
c) Freedom from checking, cracking and flaking;
d) Freedom from chalking; and
e) Freedom from spotting.

A-3.3 Evaluation of Exposed Film — The requirements of this test shall be taken to have been satisfied if performances in respect of characteristics as given in **A-3.2** is within the limits specified below:

Characteristic (1)	*Exposure* (2)	*Requirement* (3)
a) Gloss	After 3 months	The film shall have a minimum gloss retention of 55 percent of original value (except for colour categories No. 20, 21 and 22 where the minimum gloss retention shall be 40 percent of the original value)
	After 6 months	The film shall have a minimum gloss retention of 35 percent of original value (except for colour categories No. 20, 21 and 22 where the minimum gloss retention shall be 25 percent of the original value) and for colour category No. 2 where minimum shall be 50 percent of the original

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*Specification for chamois leather (*first revision*).

Characteristic (1)	*Exposure* (2)	*Requirement* (3)
	After 12 months	The film shall have a minimum gloss retention of 20 percent of the original value (except for colour categories No. 20, 21 and 22 where the minimum gloss is not specified, for colour category No. 24 where minimum shall be 10 percent and for colour category No. 2 where the minimum shall be 50 percent of the original value)
b) Colour	After 3 months	Colour shall be satisfactory
	After 6 months	Colour shall not be affected appreciably
	After 12 months	Colour shall not be affected adversely
c) Freedom from checking and flaking	Up to 12 months	The film shall remain generally free from checking, cracking and flaking. A few superficial isolated hair line cracks shall not constitute cause of failure
d) Freedom from chalking	-do-	Slight chalking shall not constitute a cause for rejection, but heavy chalking after 12 months' exposure shall be cause for rejection
e) Freedom from spotting	-do-	The film shall not show considerable spotting at any time during the exposure which adversely affects the other characteristics of the film
f) Freedom from blisters and corrosion	-do-	The film shall remain generally free from blisters and the metal underneath shall show no sign of corrosion, one or two localized corrosion and/or rust spots shall not constitute a cause of failure

A-3.4 Protection Against Corrosion — After the exposure of the film is discontinued, examine for corrosion of the metal surface of the panel underneath by removing film at 5 different places, one in the centre and one each at 4 different places near the 4 corners about 50 mm away from either edge. The paint film shall be removed by solvent type paint remover. When the film is softened by the paint remover it shall be removed by gently rubbing with cotton swab or waste jute taking care to remove adhering film of primer and/or undercoating. After removal of the film, the exposed metal shall be covered by thick mineral oil or petroleum jelly. Localized corrosion and/or rust spots shall not constitute a cause of failure. To satisfy the requirements of this standard, the metal surface shall be otherwise free from corrosion.

A-4. ACCELERATED WEATHERING TEST

A-4.1 Accelerated Weathering Apparatus — An artificial weathering apparatus of the carbon arc type for uniform and controlled exposure to the effects of heat, light and water.

A-4.2 Samples for registration shall be tested in duplicate in a suitable accelerated weathering apparatus (*see* **A-4.1**) and samples drawn from bulk supply shall be tested in a similar manner. The test panels shall be prepared as described under **A-2.2**.

INDIAN STANDARDS

ON

ENAMELS, UNDERCOATING AND FINISHING

IS:

133-1975	Enamel, interior (a) undercoating, (b) finishing (*second revision*)
148-1950	Ready mixed paint, brushing, undercoating, stoving, for enamels and general purposes, colour as required
149-1950	Ready mixed paint, spraying, undercoating, stoving for enamels and general purposes, colour as required
150-1950	Ready mixed paint, brushing, finishing, stoving, enamels, colour as required
151-1950	Ready mixed paint, spraying, finishing, stoving, enamel, for general purposes, colour as required
152-1950	Ready mixed paint, brushing, stoving, lead-free, for general purposes, colour as required
153-1950	Ready mixed paint, spraying, stoving, lead free, for general purposes, colour as required
2932-1974	Enamel, synthetic, exterior (a) undercoating, (b) finishing (*first revision*)
2933-1975	Enamels, exterior (a) undercoating, (b) finishing (*first revision*)
6125-1971	Enamel, synthetic, stoving, for automobiles
8662-1978	Enamel, synthetic, exterior (a) undercoating, (b) finishing, for railway coaches
9034-1978	Enamel, synthetic, exterior, air drying, for use on primed surfaces of motor vehicles and other equipment